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# ROBERTSON PROTECTED METAL

for  
*Industrial Building* *Covering*  
*Construction*



HH ROBERTSON CO  
BUILDING PRODUCTS  
PITTSBURGH, PA., U. S. A.

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# ROBERTSON PROTECTED METAL ROOFING, SIDING AND TRIM

*for  
Industrial Building  
Construction*



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Bulletin 75

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**HH ROBERTSON CO**

BUILDING PRODUCTS

PITTSBURGH, PA.  
U. S. A.

ROBERTSON PROTECTED METAL



## Robertson Protected Metal



TRADE MARK REG. U. S. PAT. OFF.

This illustration will give you a preliminary idea of the nature and construction of Robertson Protected Metal—familiarly known in the building field as RPM. The workman is holding a typical corrugated sheet of the material—such as is used for roofing and siding on industrial buildings. The illustration also shows a "cut-away" view of a section of RPM sheeting and indicates how four materials are combined (laid one over another and thoroughly bonded together) to form a single, strong, substantial and permanent building material. A detailed description of RPM and its uses will be found on the pages following.

## AN INDUSTRIAL BUILDING COVERING

Combining Three Important Advantages

*Permanence • Easy Erection*

*Moderate Cost*

HERE is, in fact, no truly permanent roofing and siding material that can be so easily and speedily erected as Robertson Protected Metal (RPM); and there is no material of equal permanence that is available at so low a cost.

If you need a new building quickly—and if it must be a *permanent* structure, yet one that can be economically erected—RPM will provide an ideal solution for your problem so far as roof and side walls are concerned.

### It Saves in First Cost

The use of Robertson Protected Metal on your buildings will, moreover, effect large savings in the initial cost of the entire structure—because, if you cover a building with materials that are (1) moderate in cost, (2) light in weight and (3) truly permanent, you will achieve real economies not only in the building covering itself but also in the framework and the foundations. For, of course, the lighter the building covering is, the lighter and less costly the framework and foundations can be.

### Brings Other Important Economies

A Robertson Protected Metal covering for your building will bring substan-

tial savings year by year as long as your building is in use—savings in overhead, in depreciation charges, in maintenance expense. For RPM is a *permanent* material and an *economical* material in every sense of the words. The first cost of RPM is spread over so many years of service that its cost per year is remarkably low. And the first cost of the material is its only cost. Robertson Protected Metal completely and permanently resists the destructive action of weather exposure, steam, smoke, fumes and all the other corrosive influences which surround industrial buildings. It never requires painting. Upkeep expense and costly replacements are practically eliminated. RPM saves first, last and all the time.

### A Complete Engineering Service

When you buy ordinary unprotected metal sheets for roofing or siding your purchase includes the materials and nothing more. And yet to lay out a good sheet metal roof—to specify sheets of proper dimensions so that wastage may be reduced to a minimum—to erect the sheets on the buildings so as to achieve the utmost security and permanence in the finished job—all of these things demand the application of an

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ROBERTSON PROTECTED METAL

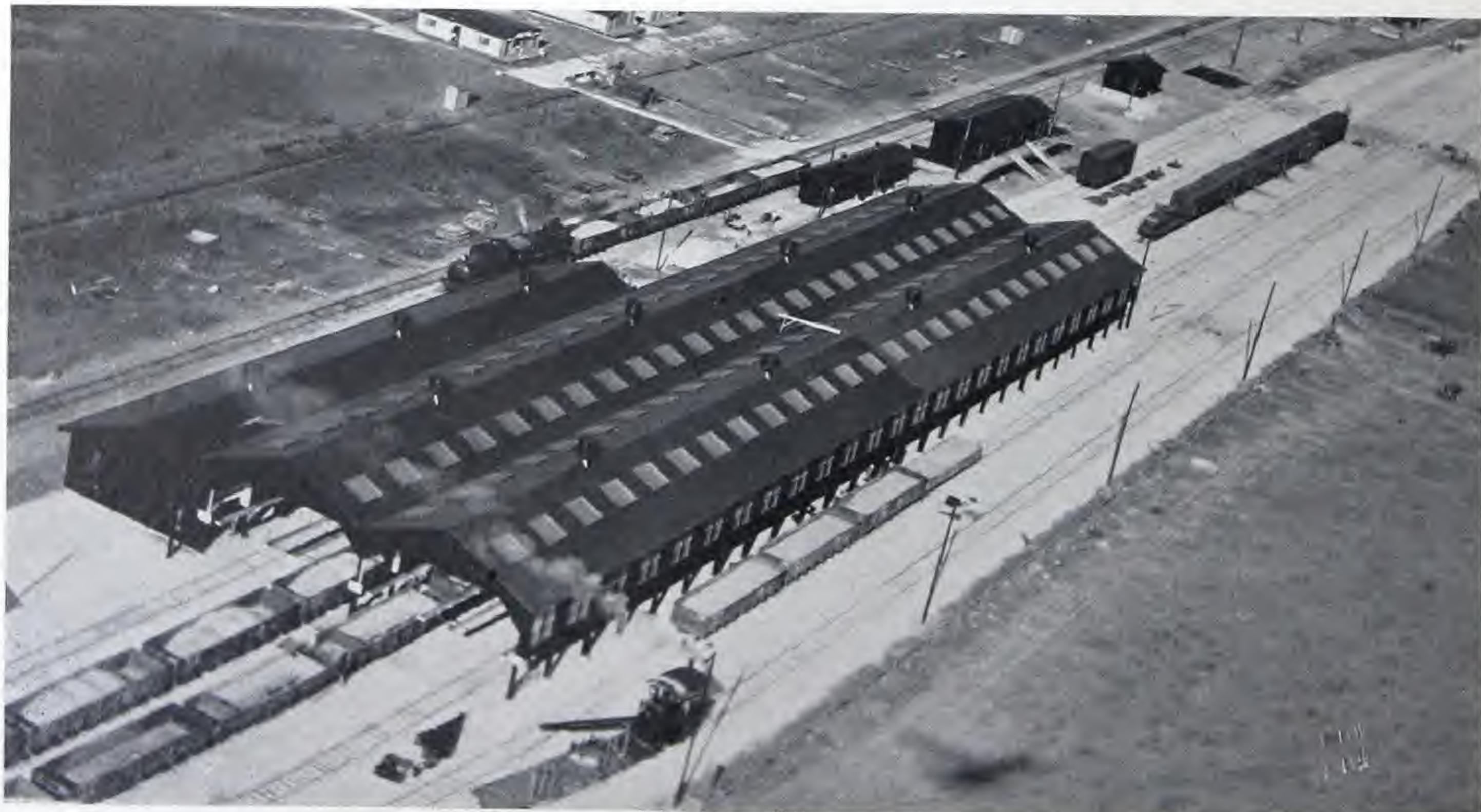
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DAVISON CHEMICAL CO., BALTIMORE, MD.

Ernest Miller, Engineer

The buildings of this company are required to withstand the most severe conditions. Outside they are surrounded by fog and salt sea air. On the inside they must resist the action of nitric, sulphuric and hydrofluoric acids. The roofing, siding, louvres, ventilators and skylights are of Robertson Protected Metal. This company began using Robertson Protected Metal in 1908 and has since placed more than 70 orders for the material in its various forms.



This picture shows the car repair shops of the Texas & New Orleans R. R. (Southern Pacific Lines) at Houston, Texas. Here is an excellent example of the adaptation of complete Robertson building coverings to railroad buildings. These structures have roofs and siding of Robertson Protected Metal; they are daylighted by Robertson Skylights and ventilated by Robertson Ventilators.

expert and specialized knowledge of sheet metal construction. All these responsibilities are placed on your shoulders when you use ordinary sheets.

But when you use Robertson Protected Metal for your building covering the situation is entirely different. The Robertson Engineering Department stands ready to co-operate with you at every step in your roofing and siding problem. Robertson Engineers will go over your building plans or blue prints and prepare a layout and specifications for roofing and siding which will insure the utmost economies in materials, labor and erection time.

### **Your Building Covering Pre-Fabricated**

The Robertson Factories work in close co-operation with the Robertson Engineering Department. The factories will fabricate the materials exactly to specifications. Roofing sheets, siding sheets and building trim will all be "cut to fit" and delivered at your building site ready for immediate erection. Little or no cutting in the field will be necessary. Complete erection instructions and erection diagrams prepared by the Robertson Engineering Department will accompany the materials. You save time, labor, materials and money all around.

### **Robertson Will Handle Erection**

If, for any reason, it is not desirable or convenient to have your own forces erect the materials, the Robertson Engineering Department stands ready to handle the complete erection job for

you. The Robertson Engineering Organization includes a corps of expert erection crews which operate all over this country and in foreign countries as well. Each crew has a highly experienced working foreman and is composed of skilled structural iron workers especially trained to handle metal sheeting and to erect Robertson Products with maximum speed and efficiency.

### **An Ideal Material for Replacements**

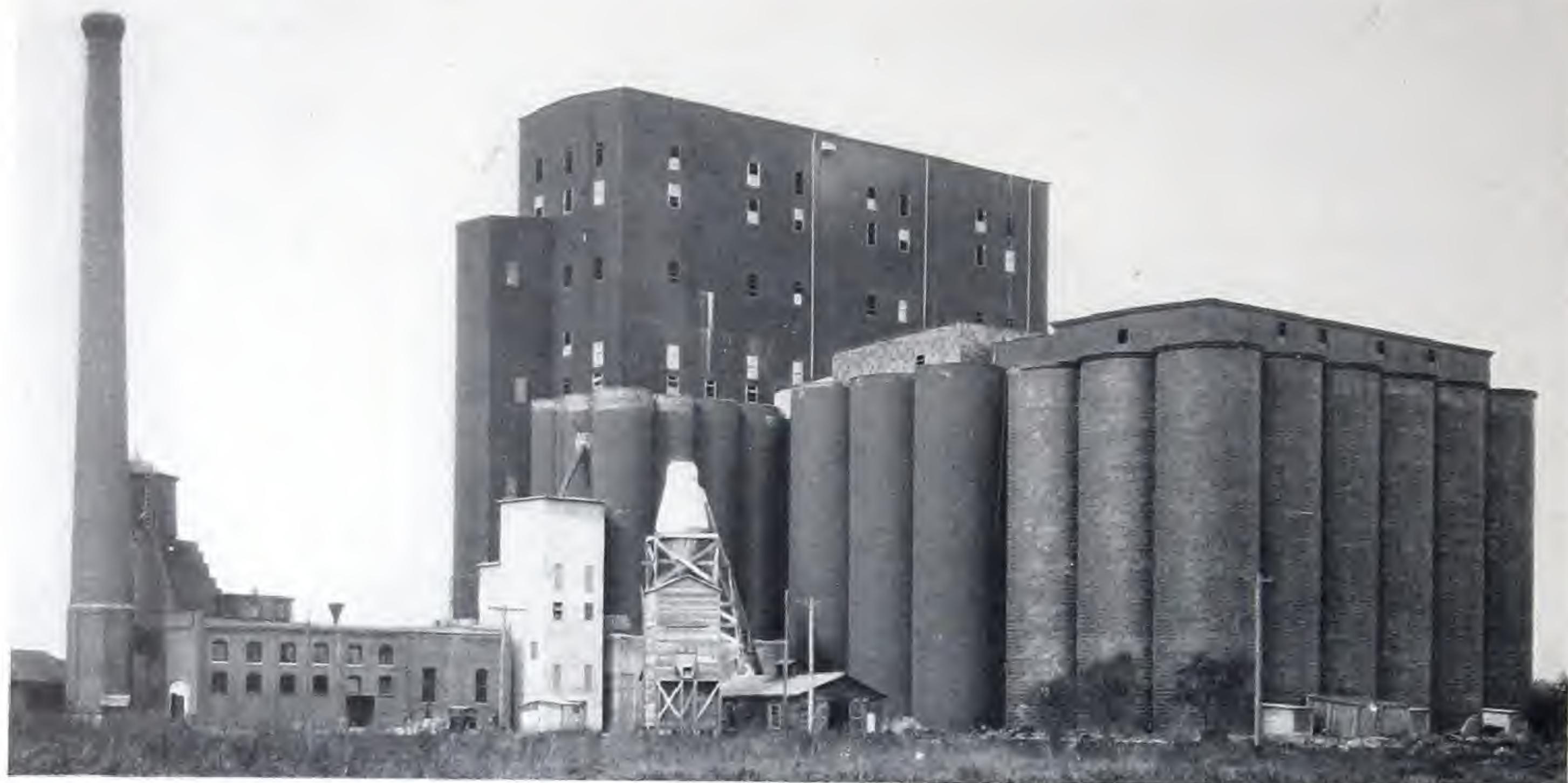
If you have a building whose roofing or siding needs replacement, Robertson Protected Metal provides an ideal material for this purpose. Replacements made with RPM are permanently made. The necessity for costly renewals is done away with for years to come.

### **Talk It Over With Robertson**

Whether your problem is one of new construction or replacement it will be decidedly worth your while to get the Robertson story in detail before you make a final choice of materials. There are Robertson Engineering Offices in all principal cities. A Robertson Engineer from the nearest office or from Robertson Headquarters at Pittsburgh will be glad to meet with you and (without obligating you in any way) make definite recommendations and cost estimates covering the adaptation of Robertson Protected Metal to your building.

On the pages following you will find detailed descriptions and data on Robertson Protected Metal—also brief descriptive matter on Robertson Ventilators and Robertson Glazing Construction.

ROBERTSON PROTECTED METAL



CHICAGO, BURLINGTON & QUINCY RAILWAY GRAIN ELEVATOR, NORTH KANSAS CITY, MO.  
Burrell Engineering & Construction Company, Engineers and Contractors

Over 46,000 square feet of Robertson Protected Metal sheets were used for roofing and siding on this new grain elevator. Twenty-five other structures built during the past three years along this company's lines testify to the satisfactory service they are receiving from Robertson Protected Metal.



ERIE RAILROAD, SALAMANCA, N. Y.

The long coaling station runway is covered with Robertson Protected Metal. As the picture shows it is constantly exposed to the destructive influence of sulphurous gases, steam, smoke and cinders. RPM is also extensively used for roofing and siding on freight houses, canopies, pumping stations, section houses, scale houses and scores of terminal buildings of various types and also at water terminals where its coatings successfully withstand the corrosive action of salt water.

# ROBERTSON PROTECTED METAL

THE present method of making Robertson Protected Metal (RPM) is the result of twenty years of manufacturing experience, together with continuous experimentation by our engineers and chemists and by the foremost research organizations of the country.

### Steel Treatment

The base, or core, of Robertson Protected Metal is a steel sheet, the surface of which is thoroughly cleansed of any substance that might interfere with the perfect bonding of the three protective coatings. It is then immersed in the first asphaltic coating.

### Asphaltic Coatings

All asphaltic coatings are produced in our own refineries. This gives us complete control of the product and insures uniformly satisfactory results. Each compound is specifically and scientifically made to fit a particular requirement.

### First Coating

When the first asphaltic coating is applied it forms a thick, elastic, gas and moisture-proof shield that entirely encloses the steel. The coating is soft, the asphaltic base containing natural oils that keep it "live" and at maximum efficiency through many years of service and under the most severe service

conditions. This coating is then completely encased in a tough sheet of asphalt-saturated asbestos felt.

### Asbestos Coating

Selected asbestos fiber is used in making this second, or middle, coating. It is so constructed that it can be impregnated to the best advantage with our asphalt saturant. It is rolled onto the still hot first coating under heat and heavy pressure so that the steel, the first coat and the felt are thoroughly and permanently bonded. The felt forms an opaque insulating covering that protects the first coat from light, heat and mechanical abrasion. On the two side edges the felt is folded over and both ends are closed, hermetically sealing the steel and the first coating.

### Waterproof Coating

The third, or waterproof coating, is applied at a high temperature to the asphalt-saturated asbestos felt. It forms a thick, tough, elastic, water-repellent and corrosion-proof surface that protects the inner coatings from mechanical abrasion and all other destructive influences. The outer coating permanently eliminates the necessity for painting.

### How Shaped Metal Is Protected

Where sheets of other than standard lengths are ordered the cut edges are

## ROBERTSON PROTECTED METAL



HUDSON COAL CO., LOREE BREAKER, PLYMOUTH, PA.  
Designed by Hudson Coal Company's Engineers

This is one of the largest coal breakers in the world and is entirely covered with Robertson Protected Metal. Its erection was one of record-breaking speed in coal breaker construction, the entire building from start to finish being completed in 130 days. It has a capacity of 6,000 tons per day. It is only one of several buildings of this company on which Robertson Protected Metal is used. Coal dust and water cause a very severe sulphurous acid condition in coal-handling buildings, and that it is successfully resisted by Robertson Protected Metal is evidenced by the fact that the Hudson Coal Company has purchased this material over threescore times.



MONTREAL HARBOUR SHEDS, MONTREAL, QUE.  
Over ten years ago the Montreal Harbour Commissioners placed their first order for Robertson Protected Metal, after making a careful investigation of the material. Since then they have ordered RPM repeatedly, finding that it combines the strength and lightness of corrugated steel with the long life and freedom from maintenance of the best built-up roofing.

treated by the Robertson Process before leaving the factory so that the metal is completely protected and corrosion cannot start. When sheets are cut in the field the edges should be covered with Robertson Fiber Cement, which is sent with each shipment.

### **Strong and Light**

The steel core of Robertson Protected Metal retains its full strength because of its triple protective coverings, so that in erecting buildings covered with RPM no allowance need be made for corrosion. For this reason RPM is usually specified two gauges lighter than when unprotected steel sheets are used. The finished sheet is light because in it a combination of materials has been effected, in which each component contributes 100% of some vital essential. The sheet carries no unnecessary weight from useless or superfluous materials.

### **Permanence**

Being completely and permanently shielded from all destructive elements the steel core will last indefinitely. The strong, tough coatings that protect the steel enable RPM to give perfect service under the most severe conditions over a long period of time.

### **Easily Erected**

Robertson Protected Metal is made in the same standard sizes and gauges as ordinary steel sheets and may be fastened in much the same manner. It is easily erected by ordinary structural steel or sheet metal workers.

### **Adaptability**

Robertson Protected Metal is an exceptionally adaptable material. It has

a maximum of strength and a minimum of weight and consequently will span, with a wide margin of safety, all standard purlin spacings. The sheets can be readily cut to exactly fit the space to be filled. The material can be worked into flashings and other standard shapes. It is easily adapted to the general run of mill buildings, doing away with the necessity for designing the buildings to meet any limitations of the roofing and siding material.

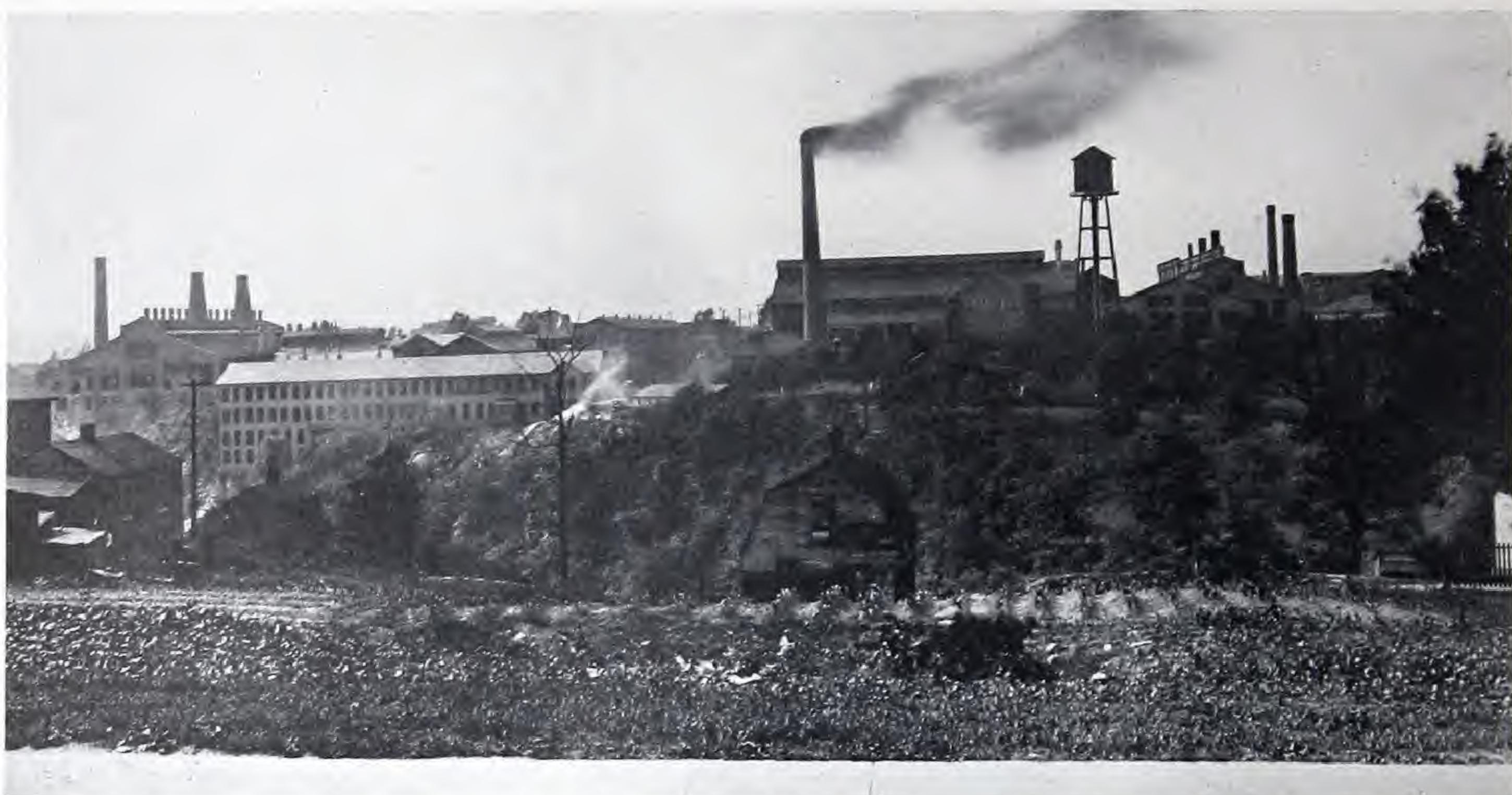
### **Insulation and Comfort**

As Robertson Protected Metal has many times the insulating value of ordinary steel sheets, buildings on which RPM is used are cooler and more comfortable (even when erected in tropical countries) than those covered with unprotected metals. On the other hand, in localities where extremely low temperatures are encountered the effective insulation provided by RPM results in buildings being easier to heat.

### **Corrosion Proof**

Robertson Protected Metal is impervious to the metal-destroying action of moisture, salt air, mine water, condensation, acid and alkali fumes, etc. It completely and permanently resists all the corrosive influences that surround industrial buildings. Corrosion is less spectacular than fire, but is believed to cause greater losses—losses not covered by insurance. It is intensified by acid and ammonia compounds found wherever coal is burned. According to an investigation by the University of Pittsburgh, losses due to the destructive action of smoke in the United States annually exceed the cost of the Panama

## ROBERTSON PROTECTED METAL



H. C. FRY GLASS COMPANY, ROCHESTER, PA.  
Austin Company, Engineers and Contractors

This company recently used 80,000 square feet of Robertson Protected Metal roofing and siding on four of its major buildings. Over half of the cut glass in the United States originates in this plant. Conditions in the glass industry require building materials capable of withstanding severe treatment.



UTAH COPPER COMPANY, BINGHAM, UTAH

Robertson Protected Metal is here shown in use at the greatest ore-producing mine in the world, measured on a tonnage basis. In the metal mining field Robertson Protected Metal is used because it insulates against heat and cold, is strong and light; weather, rust, rot and sun proof, resists acids, alkalies and the wearing action of blowing sand and saves painting and replacement. It combines the merits of corrugated steel and the best built-up roofing.

Canal. Sir Robert Hadfield, the noted English metallurgist, estimates that the annual world loss is over \$2,500,000,000.

### Maintenance

Because of its ability to withstand the elements of deterioration, RPM practically eliminates upkeep expense. An RPM roof will give years of service without requiring repairs or replacement. And, since the outer coating of the material is permanent in color, no painting is necessary.

### Fire Resistance

Robertson Protected Metal is composed of steel and asbestos, two materials that will not burn or support combustion, and asphalt, which is combustible.

### Red Label Brand

Where surroundings, contents or manufacturing processes involve a serious fire hazard, buildings should be covered with Red Label Brand Robertson Protected Metal. This product is a new development following extensive experiments with the finished product.

Red Label Brand Robertson Protected Metal is made in the same manner as the standard product, but the asphalt is treated with our patented process as a result of which it will not support combustion. This treatment in no way affects the durability of the sheets.

If the material is in contact with a fire of sufficient intensity the asphalt covering will burn in the immediate fire zone. The fire will not be spread from this zone, so that a haphazard fire will not be communicated to other parts of

the same or adjoining buildings. As soon as the source of external heat is removed the fire on the Red Label sheets, even in the area affected by the fire, will be immediately self-extinguished.

In a general fire in the contents of a building there would be an extensive fire zone and the heat generated would be expected to destroy the coatings over a considerable area.

### Aluminum Finish

Robertson Protected Metal can be furnished in Aluminum Finish, applied over the waterproofing envelope on both sides. This finish, while it has the limitations found in all paints, forms a good base for future paintings. The aluminum finish does not add to the protective qualities of the material; it is used where a light-colored sheet is desired for appearance or for brightening the interior of a building.

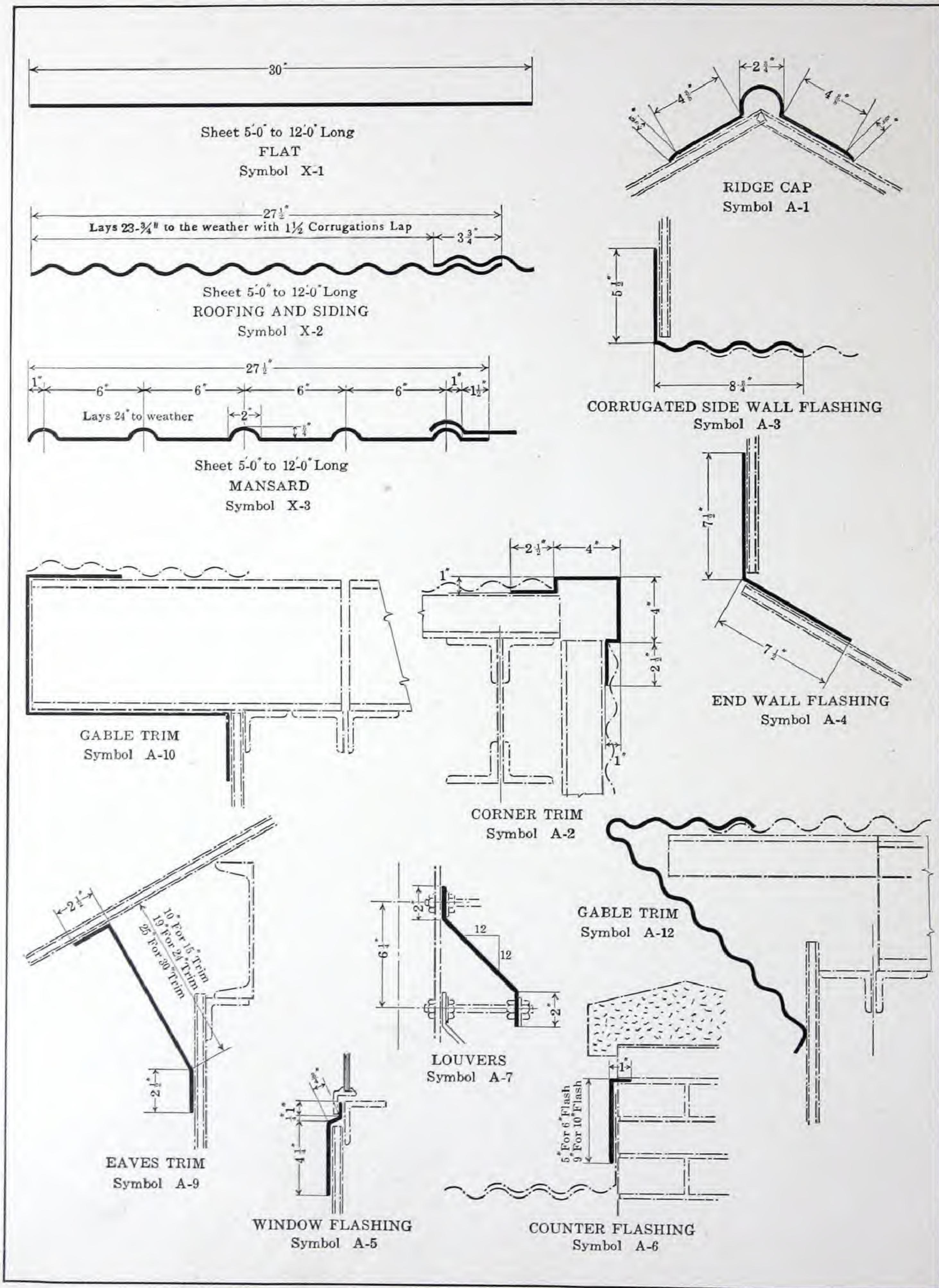
### Slate Surface Robertson Protected Metal

Slate Surface RPM is made by applying an extra coating of asphalt to the exterior side of the standard RPM sheet and rolling a coat of crushed slate onto this additional asphalt covering. The interior surface remains the same as the standard sheet.

Slate Surface RPM is manufactured in two colors—red and green—and the process can be applied to flat and corrugated sheets, and also to standard flashings. The result is a very attractive sheet, with the added protection and insulation afforded by the extra slate covering.

ROBERTSON PROTECTED METAL

Standard RPM Building Details



# Roofing, Siding and Trim Engineering Data

## Forms and Sizes

ROBERTSON Protected Metal is made in a variety of standard forms and sizes which good practice has demonstrated to be most useful, economical and attractive in the general run of construction work. Besides roofing and siding sheets we supply ridge caps, flashings, louvres, ventilators and skylights made of Robertson Protected Metal. We also manufacture special shapes, sizes and gauges according to specifications to fit any conditions that engineers may encounter.

## Colors

ROBERTSON Protected Metal is made in two standard and permanent colors, maroon and black.



Robertson Protected Metal Corrugated Roofing and Siding Sheet.

## Standard Corrugated Roofing and Siding Sheets

THESE sheets of Robertson Protected Metal are  $27\frac{1}{2}$  inches wide of 26 to 18 gauges inclusive, are carried in stock lengths of even feet from 5 to 12 feet inclusive and have  $10\frac{1}{2}$  corrugations each  $2\frac{5}{8}$  inches wide and  $\frac{1}{2}$

inch deep. They have a net covering width of  $23\frac{3}{4}$  inches with one and one-half corrugations side lap. See drawing on page 12.

## Roof Pitch

ROBERTSON Protected Metal corrugated sheets can be used on any roof pitch on which other corrugated sheets can be applied. Where the pitch is less than 4 inches in 12 inches both side and end laps should be laid in asphaltic cement. Corrugated sheets should not be used on roofs with a slope of less than 2 inches in 12 inches.

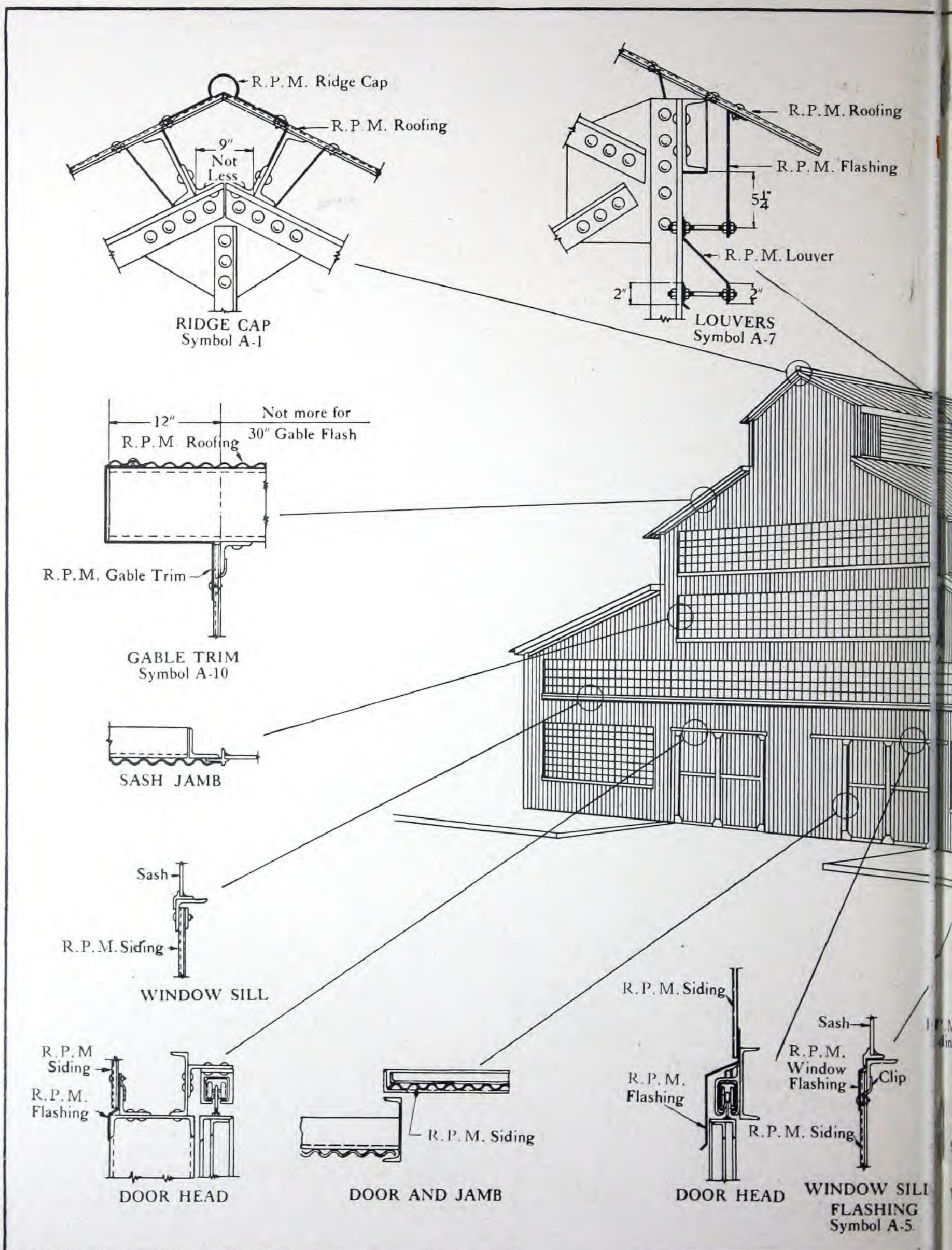
## Standard Mansard Sheets

THIS special form of beaded sheet has five beads to each sheet. Each bead measures 2 inches wide by  $\frac{3}{4}$  inch high. Sheets are made  $27\frac{1}{2}$  inches wide and in lengths of even feet from 5 to 12 feet inclusive. Each sheet has a net covering width of 24 inches. The Mansard Sheets possess architectural advantages for both roofing and siding purposes. See drawing on page 12.

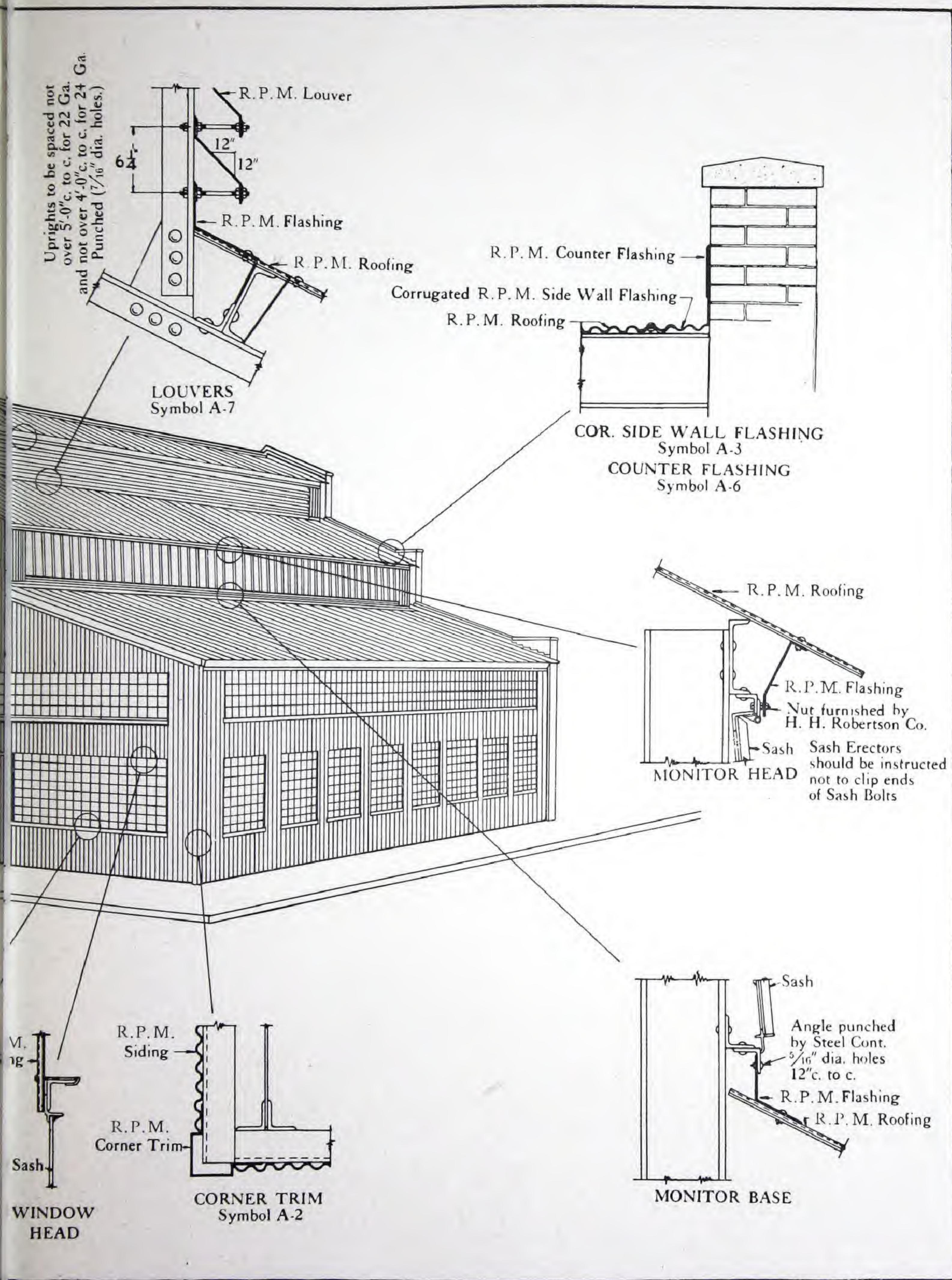


Robertson Protected Metal Mansard Sheet.

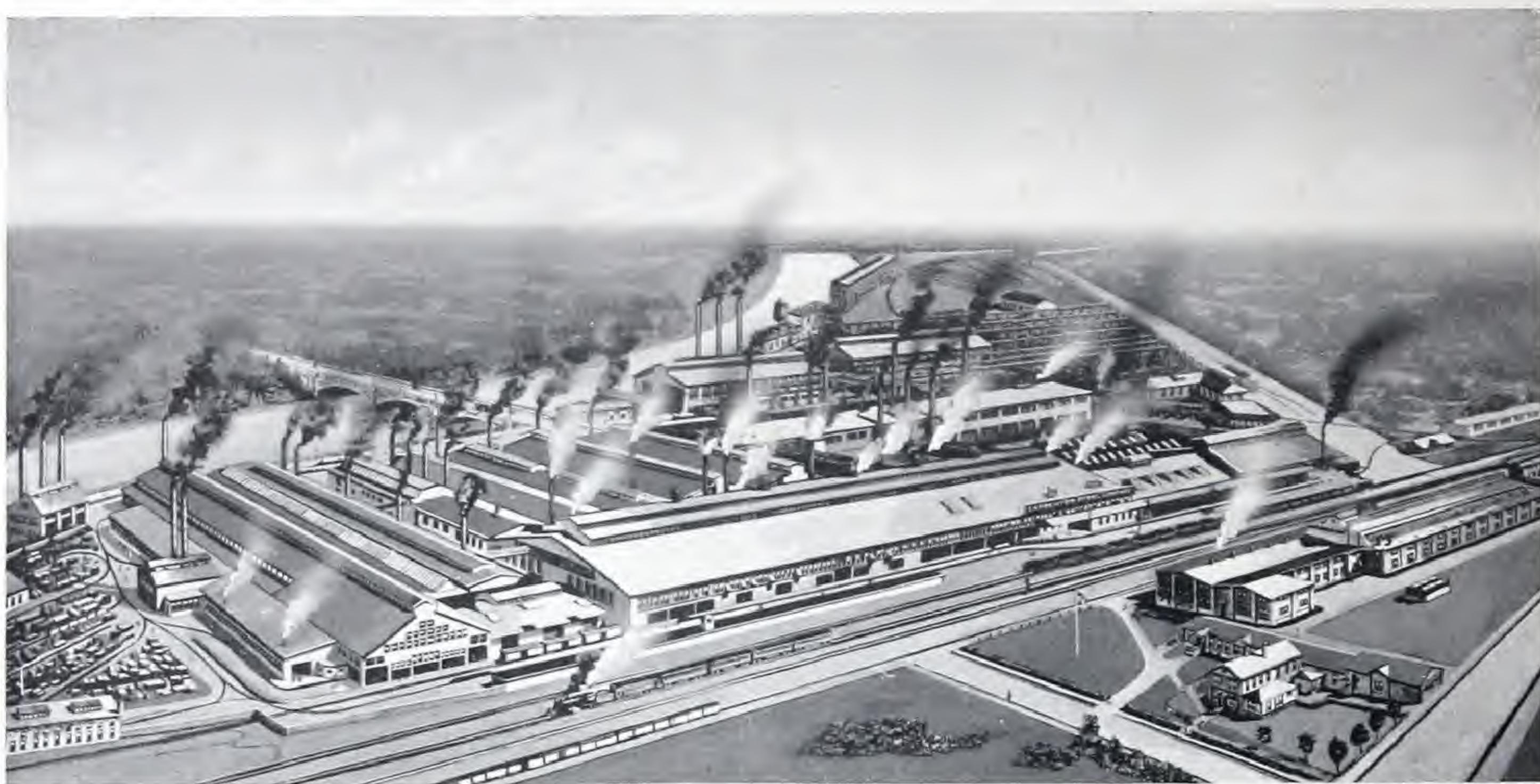
ROBERTSON PROTECTED METAL



ROBERTSON PROTECTED METAL



ROBERTSON PROTECTED METAL



CARPENTER STEEL COMPANY, READING, PA.

Robertson Protected Metal is extensively used in this plant for roofing, siding, gutters and downspouts on open hearth, gas producer, electric furnace and other buildings.



SCOTT PAPER COMPANY, CHESTER, PA.

Geo. F. Hardy, Mill Engineer, New York City

Illustrating Robertson Skylights and Robertson Protected Metal paper machine hoods, installed at the home of "Thirsty Fibre." 20,000 cubic feet of steam per minute are exhausted from each of these hoods, and there is no condensation drip from the roof or skylights. The hood pipes are 5 feet in diameter.

### Standard Flat Sheets

THESE sheets are made 30 inches wide of 26 to 18 gauges, inclusive, in lengths of even feet from 5 to 12 feet, inclusive. They are also made in less than 30-inch widths for special purposes. They may be used for interior



Robertson Protected Metal Flat Sheet.

sheathing. A wood batten nailed over the joint gives a panel effect and a well finished appearance. These flat sheets are also used in making ventilating flues, ventilators, acid fume ducts, hoods, conveyor boxes, light partition walls and for other classes of service which demand the use of a permanent, workable and attractive sheet of corrosion-proof metal. See drawing on page 12.

### Standard Louvres

ROBERTSON Protected Metal Standard Louvres are made in gauges 26 to 20 and in any length up to 10 feet inclusive and are 10 inches wide. Louvres, on account of their lo-



Robertson Protected Metal Louvre.

cation on a building, come in direct contact with fumes, acids, alkalies, gases and moisture, as well as heated air from within the building; while on the outside they have to withstand weather conditions and extremes of heat and cold. For this reason it is highly important that they be protected from corrosion by the Robertson Process. For details of Robertson Louvres, see drawings on pages 12, 14 and 15.



Robertson Protected Metal Ridge Cap.

### Standard Ridge Caps

THE standard roll is  $2\frac{1}{2}$  inches in diameter with wings 5 inches on each side. These ridge caps are made in gauges 24 to 20 inclusive and standard lengths of 5 and 10 feet. See drawings on pages 12 and 14.

### Standard Flashings

STANDARD Robertson Protected Metal Flashings are furnished in accordance with the details on page 12 and are manufactured in gauges 26 to 20 inclusive and in standard lengths of 8 feet. Special lengths up to a maximum of 10 feet can be furnished where required. Robertson Protected Metal Flashings are manufactured from standard Robertson Protected Metal flat sheets and all edges are fully protected at the factory.

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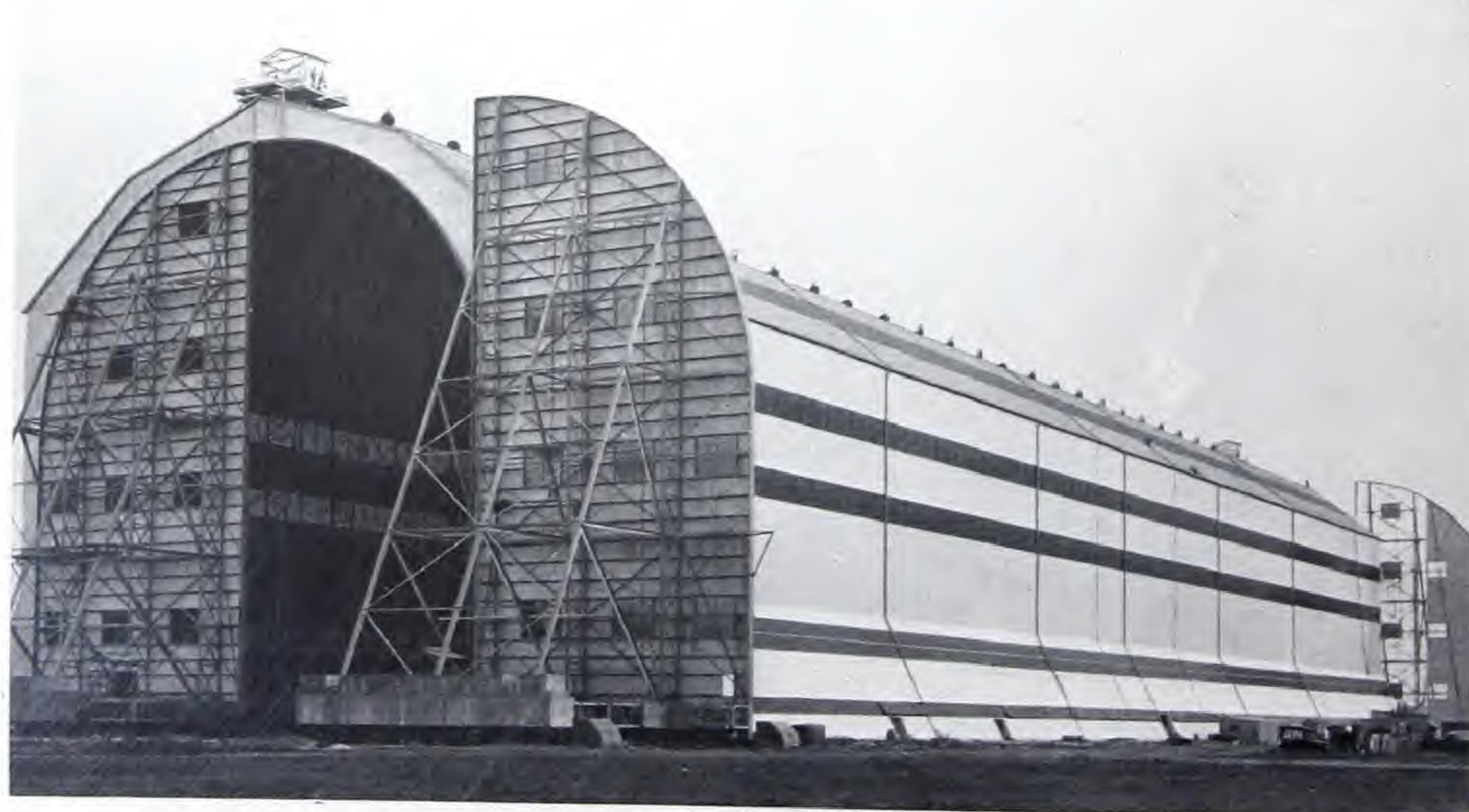
ROBERTSON PROTECTED METAL

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GARFIELD SМELTING CO., GARFIELD, UTAH

Robertson Protected Metal has been used on the roofs of these buildings as well as on those of many other American Smelting and Refining Co. plants. It provides complete protection against the destructive gases, fumes and chemical-laden dust arising from smelting operations.



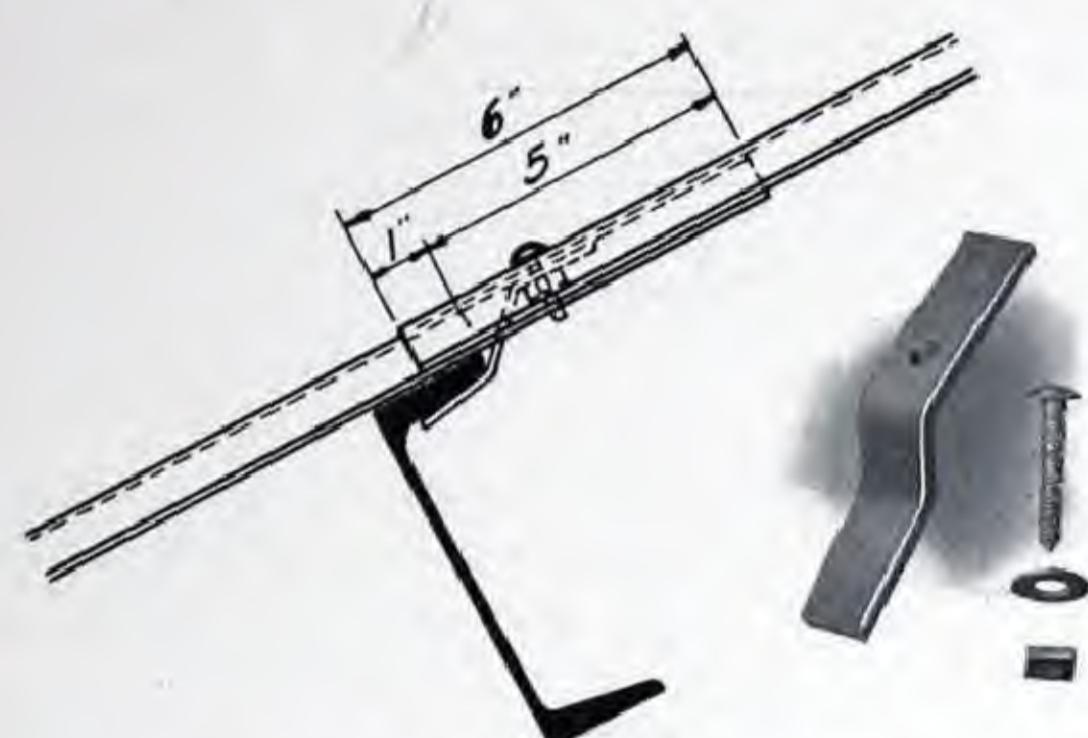
UNITED STATES GOVERNMENT BALLOON HANGAR, SCOTT FIELD, ILL.

Erection supervised by Constructing Quartermaster

This is one of a number of balloon hangar installations on which the insulating value of Robertson Protected Metal plays an important part. The United States Government is a large and regular purchaser of this product.

### Fastenings—Clip, Bolt and Nut

THESE are used for fastening roofing or siding sheets to a steel structure where the legs of purlins or girts face up the roof. The clip is of sherardized steel  $\frac{3}{4} \times \frac{1}{8}$  inch and of suitable



Standard Clip, Bolt and Nut.

length. The bolt and nut are sherardized and the bolt has a special mushroom-shaped head designed to make a tight and permanent joint.

### Strap and Bolt

THIS fastener is used for securing roofing and siding sheets to the supporting structure. The strap is of galvanized steel  $\frac{3}{4}$  inch wide, of 18



Standard Strap and Bolt.

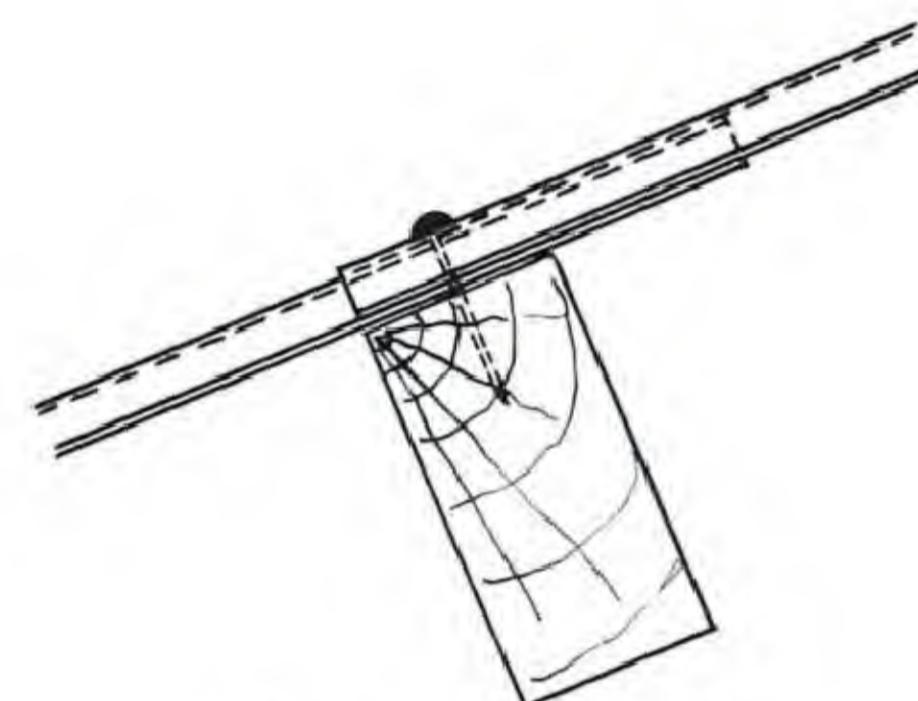
gauge, and of suitable length to fit the purlins or girts. The same style of bolt is used as for fastening with clips.

### Mushroom Head Bolts

MUSHROOM Head Sherardized Bolts are used for applying clips and straps and also for fastening the side and end laps of the sheets. These bolts are  $\frac{1}{4}$  inch in diameter and are furnished in standard lengths of one inch and  $1\frac{3}{8}$  inches.

### Nails—Special for Robertson Protected Metal

IN ATTACHING Robertson Protected Metal frame to a nailing strip or a wood structure it is highly important that our special nail be used. This nail is made in lengths of from



Concave Head Nail.

$1\frac{1}{4}$  to 3 inches inclusive. It has a special mushroom head which sets firmly into the asbestos wearing surface and makes a tight joint when the nail is driven home.

### Aluminum Fastener

STANDARD Straps and Bolts made of aluminum can also be furnished where desired.

## ROBERTSON PROTECTED METAL

### Weight in Pounds per Linear Foot of Robertson Protected Metal Flashing of Various Girths

Girth in Inches.

Guage	6"	7½"	10"	12"	15"	24"	30"
26	.7	.88	1.16	1.4	1.75	2.8	3.5
24	.8	1.00	1.33	1.6	2.00	3.2	4.0
22	1.0	1.25	1.67	2.0	2.50	4.0	5.0
20	1.2	1.50	2.00	2.4	3.00	4.8	6.0

All weights subject to variations.

### Weight of Robertson Protected Metal in Pounds per 100 square feet of Material Area

Gauge	CORRUGATED OR MANSARD				FLAT			
	Net		For Crated Shipments Add		Net		For Crated Shipments Add	
	Black	Maroon	Domestic	Export	Black	Maroon	Domestic	Export
26	145	151	14	20	135	141	10	16
24	175	181	15	21	160	166	11	17
22	200	206	16	22	185	191	12	18
20	230	236	17	24	210	216	13	21
18	285	291	20	30	260	266	16	25

All weights subject to variations.

### Size of Purlins for Various Spacing of Trusses

Spacing of Purlins	Length of Purlins or Distance between Trusses											
	12'		14'		16'		18'		20'		22'	
	C	I	C	I	C	I	C	I	C	I	C	I
3'- 9"	4"-5½ lb	4"-7½ lb	5"-6½ lb	4"-7½ lb	6"- 8 lb	5"- 9½ lb	7"- 9½ lb	5"- 9½ lb	7"- 9½ lb	6"-12½ lb	8"-11½ lb	6"-12½ lb
4'- 4"	5"-6½ "	4"-7½ "	6"- 8 "	5"- 9½ "	6"- 8 "	5"- 9½ "	7"- 9½ "	6"- 9½ "	6"-12½ "	8"-11½ "	6"-12½ "	8"-11½ "
4'- 9"	5"-6½ "	4"-7½ "	6"- 8 "	5"- 9½ "	7"- 9½ "	5"- 9½ "	7"- 9½ "	7"- 9½ "	6"-12½ "	8"-11½ "	6"-12½ "	8"-11½ "
5'- 4"	5"-6½ "	4"-7½ "	6"- 8 "	5"- 9½ "	7"- 9½ "	5"- 9½ "	6"-12½ "	8"-11½ "	6"-12½ "	8"-11½ "	6"-12½ "	8"-11½ "
5'- 9"	5"-6½ "	4"-7½ "	6"- 8 "	5"- 9½ "	7"- 9½ "	5"- 9½ "	6"-12½ "	8"-11½ "	6"-12½ "	8"-11½ "	6"-12½ "	8"-11½ "
6'- 6"	6"- 8 "	5"-9½ "	7"-9½ "	5"-9½ "	7"-9½ "	5"-9½ "	6"-12½ "	8"-11½ "	6"-12½ "	8"-11½ "	6"-12½ "	8"-11½ "
6'-10"	6"- 8 "	5"-9½ "	7"-9½ "	6"-12½ "	8"-11½ "	6"-12½ "	9"-13½ "	7"-15 "	9"-13½ "	7"-15 "	9"-13½ "	7"-15 "
7'- 6"	6"- 8 "	5"-9½ "	7"-9½ "	6"-12½ "	8"-11½ "	6"-12½ "	9"-13½ "	7"-15 "	9"-13½ "	7"-15 "	9"-13½ "	7"-15 "
7'-10"	6"- 8 "	5"-9½ "	7"-9½ "	6"-12½ "	8"-11½ "	6"-12½ "	9"-13½ "	7"-15 "	9"-13½ "	7"-15 "	9"-13½ "	7"-15 "

Maximum unit bending stress, 16,000 pounds per square inch.

Dead load equals weight of Robertson Protected Metal corrugated roofing and purlins, from 3½ to 6 pounds per square foot.

Live load equals 40 pounds per square foot on horizontal surface.

Pitch of roof, 6 inches per foot.

If purlins are trussed, lighter sections may be used.

### Supporting Purlin and Girt Spacings

For corrugated Sheets on roof structures having a rise of 4" or more in 12", supporting purlins may be spaced as follows:

- No. 26 gauge for spans up to 3'9" centers.
- No. 24 gauge for spans up to 4'9" centers.
- No. 22 gauge for spans up to 5'9" centers.
- No. 20 gauge for spans up to 6'6" centers.
- No. 18 gauge for spans up to 7'6" centers.

Where the roof has a rise of not less than 2" in 12" and not over 4" in 12" and the side and end laps of corrugated sheets are laid in fiber cement the supporting purlins may be spaced as follows:

No. 26 gauge for spans up to 3'3" centers.

No. 24 gauge for spans up to 4'3" centers.

No. 22 gauge for spans up to 5'3" centers.

No. 20 gauge for spans up to 6'3" centers.

No. 18 gauge for spans up to 7'3" centers.

For Corrugated Robertson Protected Metal Sheets used for Siding, the supporting girts may be spaced as follows:

No. 26 gauge for spans up to 3'10" centers.

No. 24 gauge for spans up to 4'10" centers.

No. 22 gauge for spans up to 5'10" centers.

No. 20 gauge for spans up to 6' 8" centers.

## Estimating Data

### Method of Estimating Quantity

**A**REAS of Robertson Protected Metal Sheets may be figured by multiplying the total added length of a number of sheets by the width of a sheet.

The standard corrugated sheets are  $27\frac{1}{2}$  inches wide, which is 2.3 feet.

Therefore, the total area of sheets given in the following example is as follows:

Number of			
Sheets	Length	Total Feet	
30	6'0"	180	
30	9'0"	270	
60	10'0"	600	
		<hr/>	
Total Linear Feet . . . . .	1050	2.3	
		<hr/>	
		2100	
		<hr/>	
		315	
		<hr/>	
Total Material Area . . . . .	2415	sq. ft.	

Standard Flat Robertson Protected Metal Sheets are 30 inches wide; therefore, the added length of a number of sheets would be multiplied by  $2\frac{1}{2}$ .

To obtain an approximate figure on corrugated Robertson Protected Metal required for roofs and siding, add 25 per cent. to the actual building area.

This takes care of all usual end and side laps.

It is, however, always desirable to submit sketches or blueprints so that the correct quantity and gauge of sheets, as well as flashing and fasteners, can be estimated. Blueprints will be returned with our estimate, when requested.

## Specifications for Robertson Protected Metal

**A**LL roofing and siding shall be of black} corrugated Robertson Protected Metal, as manufactured by the H. H. Robertson Company, Pittsburgh, Pa.

Roofing sheets shall be of . . . . . \* gauge and siding sheets and flashing of . . . . . \* gauge.

All sheets to be laid with a side lap of  $1\frac{1}{2}$  corrugations and a minimum end lap of 6 inches for roofing and 3 inches for siding.

All roofing and siding sheets to be installed in accordance with the manufacturer's standard erection instructions.

\*No. 18, No. 20, No. 22, No. 24 and No. 26 gauge, depending on purlin or girt spacing. See page 20.

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ROBERTSON PROTECTED METAL

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UNITED STATES MALLEABLE IRON COMPANY, TOLEDO, OHIO

This company has used over 85,000 square feet of Robertson Protected Metal on its five newest buildings because of the ability of the material to withstand the most severe fume conditions encountered around foundries, its insulating qualities which reduce condensation difficulties and its long life and freedom from maintenance.



STOCKHAM PIPE & FITTINGS COMPANY, BIRMINGHAM, ALA.

This airplane view shows over 168,000 square feet of Robertson Protected Metal roofing and siding on this company's plant. In the background RPM is being placed on their malleable iron foundry, which is the only foundry of this kind south of the Ohio River. The Tennessee Coal, Iron & Railroad Company, the Virginia Bridge & Iron Company, the Birmingham Machine & Foundry Company, the National Cast Iron Pipe Company, the Gulf States Chemical Company, the Sloss-Sheffield Steel & Iron Company, the American Cast Iron Pipe Company and the Conners Steel Company are among the other large users of Robertson Protected Metal in the Birmingham district.

## Some Well Known Users of Robertson Protected Metal

LARGE companies usually investigate building materials carefully before purchasing. They consider them from the standpoints of strength, durability, lightness and adaptability. Then they consider (1) the initial cost of the material in place and the annual interest on this investment, (2) the annual maintenance cost and the interest there-

on and (3) the depreciation. The sum of all these, divided by the number of years of service the material will give, is the basis on which the "cost per year" is determined. One proof of the manner in which Robertson Protected Metal meets these requirements is shown by the number of well-known users of the material.

<i>Companies</i>	<i>First Order</i>	<i>No. of Orders</i>
Aluminum Company of America	1915	17
American Locomotive Company	1913	20
American Smelting & Refining Company and Subsidiaries	1915	41
American Steel & Wire Company	1908	51
Anaconda Copper Mining Company	1909	24
Armour & Company	1910	38
Armstrong Cork Company	1912	34
Atlantic Gulf Oil Corporation	1920	19
Bethlehem Steel Corporation and Subsidiaries	1910	92
Carnegie Steel Company	1912	100
Chicago, Burlington & Quincy Railroad Company	1918	56
Chickasaw Ship & Car Building Company	1918	30
Columbia Chemical Company	1914	85
Crucible Steel Company of America and Subsidiaries	1913	76
Davison Chemical Company	1908	76
E. I. du Pont de Nemours Powder Company	1909	34
Firestone Tire & Rubber Company	1914	18
General Chemical Company	1909	134
General Electric Company	1915	16
Grasselli Chemical Company	1911	40
Hudson Coal Company	1914	70
Jamison Coal & Coke Company	1910	59
Jones & Laughlin Steel Corporation	1913	38
The Koppers Company	1918	65
Lehigh Coal & Navigation Company	1914	48
New York Central Lines	1913	30
New York, New Haven & Hartford Railway Company	1918	26
Packard Motor Car Company	1915	28
Pennsylvania Railway System	1909	126
Pittsburgh Plate Glass Company	1913	117
Royster Guano Company, F. S.	1910	39
Semet-Solvay Company	1910	77
Southern Railway System	1915	23
Standard Oil Companies and Subsidiaries	1912	161
Tennessee Coal, Iron & Railroad Company	1916	80
Timken-Detroit Axle Company	1916	20
United States Cast Iron Pipe & Foundry Company	1914	47
United States Government	1910	153
United States Steel Corporation and Subsidiaries	1911	285
Vacuum Oil Company	1913	58
Westinghouse Electric & Manufacturing Company	1916	12

# THE ROBERTSON VENTILATOR

Like every other Robertson Product, the new Robertson Ventilator is a scientific development. It is the result of exhaustive experiments in one of the country's most prominent industrial research laboratories.

Every detail of its construction is designed, placed and proportioned to increase its ventilating capacity.

The Robertson suction band multiplies the displacement or air pulling area of the ventilator stack more than six times. Passing winds blowing across the top and bottom of this band create a tremendous suction in the ventilator stack which literally drags foul air, fumes, etc., out of the building.



PHANTOM VIEW

No ventilator can develop a powerful exhaust if it permits outside air currents to enter the ventilator pipe and obstruct the flow of air from the building, and very few ventilators operate efficiently when subjected to winds deflected upward by sloping roofs.

The Robertson Ventilator is scientifically designed to overcome both these factors of resistance—down-draft and up-draft.

The ventilator cap and the louvre ring (shown in the cross-section view) make the Robertson Ventilator storm proof and positively exclude downward

air currents. The wind baffle and the stack louvre provide effective protection against up-drafts from pitched roofs. Maximum suction power and minimum resistance are assured.



OUTSIDE VIEW

Because of its remarkable suction power and because it eliminates the effects of up-drafts and down-drafts, the Robertson Ventilator exhausts from 50 to 60% more air than an open pipe—a most unusual rating as compared with the exhaust capacities of ventilators of other types—whether stationary or rotary. It ventilates as efficiently at low wind velocities as at high. It performs as satisfactorily on sloping roofs as on flat roofs.

With their superior exhaust capacity, Robertson Ventilators will effect one of two savings in the original cost of ventilator equipment. By installing Robertson Ventilators, the desired volume of air can be removed from any building with *fewer* ventilators or with ventilators of *smaller size*.

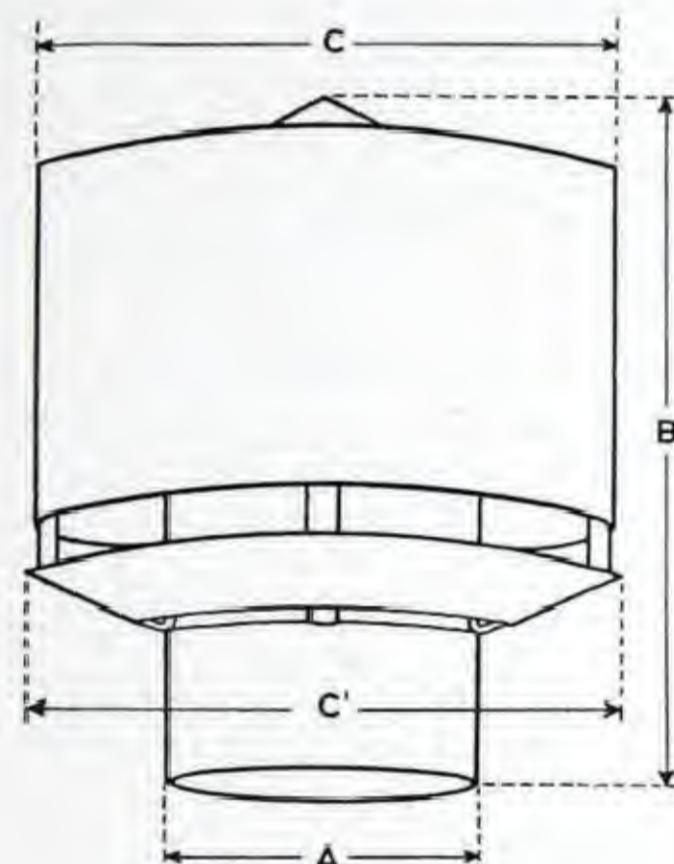
The Robertson Ventilator is of the stationary type. It is a strong, immovable, rigidly constructed unit with no moving parts whatsoever.

The Robertson Ventilator is made of Robertson Protected Metal, copper or galvanized steel.

## Dimensions, Gauges and Weights

As can be seen from the table below, Robertson Ventilators are made in all sizes used in standard practice. You will note, too, that the Robertson Protected Metal or galvanized iron used in each size is of a gauge which assures rigidity, strength and endurance.

Complete erection instructions are shipped with each ventilator.



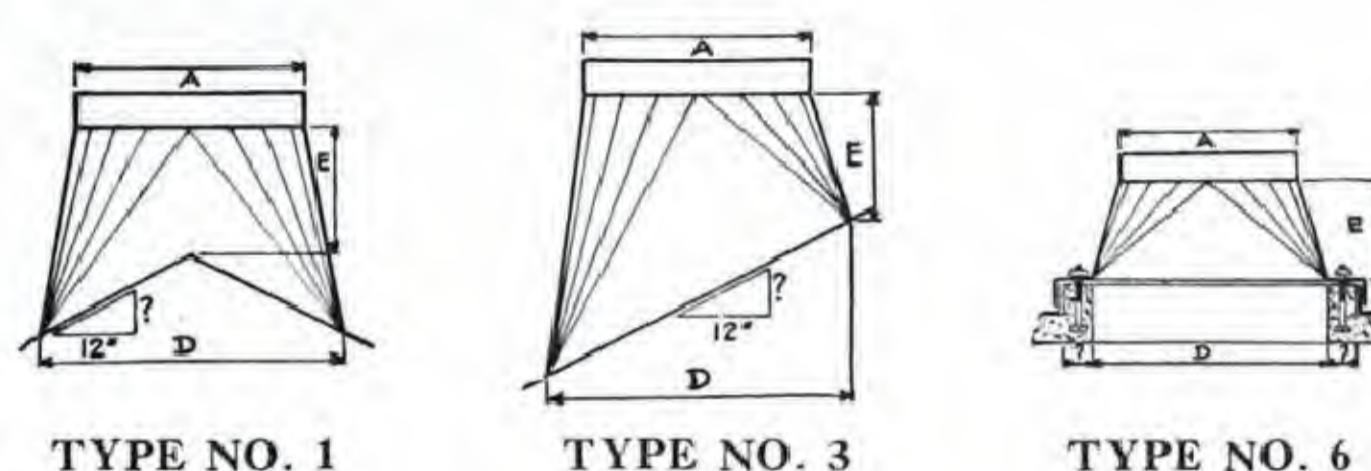
DIMENSIONS, GAUGES AND WEIGHTS OF VENTILATORS

A	B	Dimensions in Inches		Gauge Galv. and RPM	Approximate Net Weights in Pounds		Shipping Weights in Pounds	
		C	C'		Galv.	RPM	Galv.	RPM
12	22 $\frac{5}{8}$	22 $\frac{3}{4}$	24	24	31	46	62	77
14	27 $\frac{1}{16}$	26 $\frac{1}{2}$	28	24	40	59	75	95
16	29 $\frac{3}{4}$	30 $\frac{1}{8}$	32	24	48	70	88	110
18	32 $\frac{7}{8}$	34	36	24	57	87	127	157
20	38 $\frac{7}{8}$	37 $\frac{1}{2}$	40	24	80	103	147	170
24	45	45 $\frac{3}{8}$	48	24	130	160	220	250
30	55 $\frac{3}{8}$	57	60	22	191	247	408	464
36	67 $\frac{3}{4}$	67 $\frac{1}{2}$	72	22	275	258	513	596
*42	74 $\frac{7}{8}$	79 $\frac{3}{8}$	84	20	528	584	638	694
*48	89 $\frac{3}{8}$	91	96	20	635	782	835	982
*54	101 $\frac{3}{4}$	102	108	20	796	969	1061	1234
*60	108 $\frac{5}{8}$	113	120	20	1127	1395	1467	1735
*66	126 $\frac{1}{2}$	125	132	20	1360	1645	1731	2016
*72	129	136	144	20	1680	1995	2084	2398
*84	149 $\frac{3}{4}$	158 $\frac{3}{4}$	168	18	2314	2805	2869	3360

\*Indicates that ventilator is shipped partially knock-down.

Bases can be furnished with Robertson Ventilators to meet the requirements of any kind of roof. The three types diagrammed in the next column are most commonly used. Types 1 and 3 are made to fit roofs of any slope; in ordering specify roof pitch. Type 6

is made to fit over concrete curbs; in ordering give size of opening and curb. Round to square bases are strongest and are shipped unless special construction is ordered.



DIMENSIONS, GAUGES AND WEIGHTS OF VENTILATOR BASES

A	D	E	Dimensions in Inches		Gauge Galv. and RPM	Approximate Net Weights in Pounds		Shipping Weights in Pounds	
			Galv.	RPM		Galv.	RPM	Galv.	RPM
12	16x16	10	22	12	16	35	40		
14	18x18	10	22	18	23	43	48		
16	21x21	10	22	25	30	50	55		
18	24x24	10	22	35	40	70	75		
20	28x28	10	22	45	55	90	100		
24	32x32	10	22	55	75	110	130		
30	38x38	12	20	75	100	135	160		
36	45x45	14	20	110	140	170	200		
*42	52x52	14	18	140	180	200	250		
*48	60x60	15	18	190	230	270	310		
*54	68x68	16	18	240	300	330	390		
*60	78x78	20	18	300	380	400	480		
*66	87x87	22	18	360	480	480	620		
*72	96x96	24	18	460	580	600	750		
*84	110x110	26	16	660	770	850	950		

\* Indicates that the ventilator is shipped knock-down.

### Prices and Complete Descriptions

Prices, tables of capacities and complete descriptive data for Robertson Ventilators of all sizes will be sent on request.

### Service

The H. H. Robertson Company maintains a staff of experienced ventilation engineers whose services are available without obligation, to architects, engineers and building owners who may desire advice, co-operation or assistance in the working out of ventilation problems. Write for copy of the Robertson Ventilation Data Book.

## ROBERTSON GLAZING CONSTRUCTION

Robertson Glazing Construction offers the following valuable advantages:

(1) It does away with all avoidable glass breakage; (2) it is designed to eliminate leakage; (3) it can be made proof against corrosion and the consequent deflection of load-carrying members; (4) it provides the lowest possible combination of first cost, maintenance and depreciation.

Robertson Glazing Construction is available in three forms, all having the same basic advantages mentioned above, but each suitable for special uses:

- (1) Glass roofs for large building areas.
- (2) Self-supporting skylights.
- (3) Monitor and saw-tooth sash.

Robertson Glazing Construction is manufactured in two basic types (see following page). Type B has been used for years by the most prominent corporations in almost every industrial field. It is especially adapted to the requirements of buildings exposed to severe corrosive conditions, for its sheet metal parts are made rust and corrosion proof by the Robertson Process of Metal Protection.

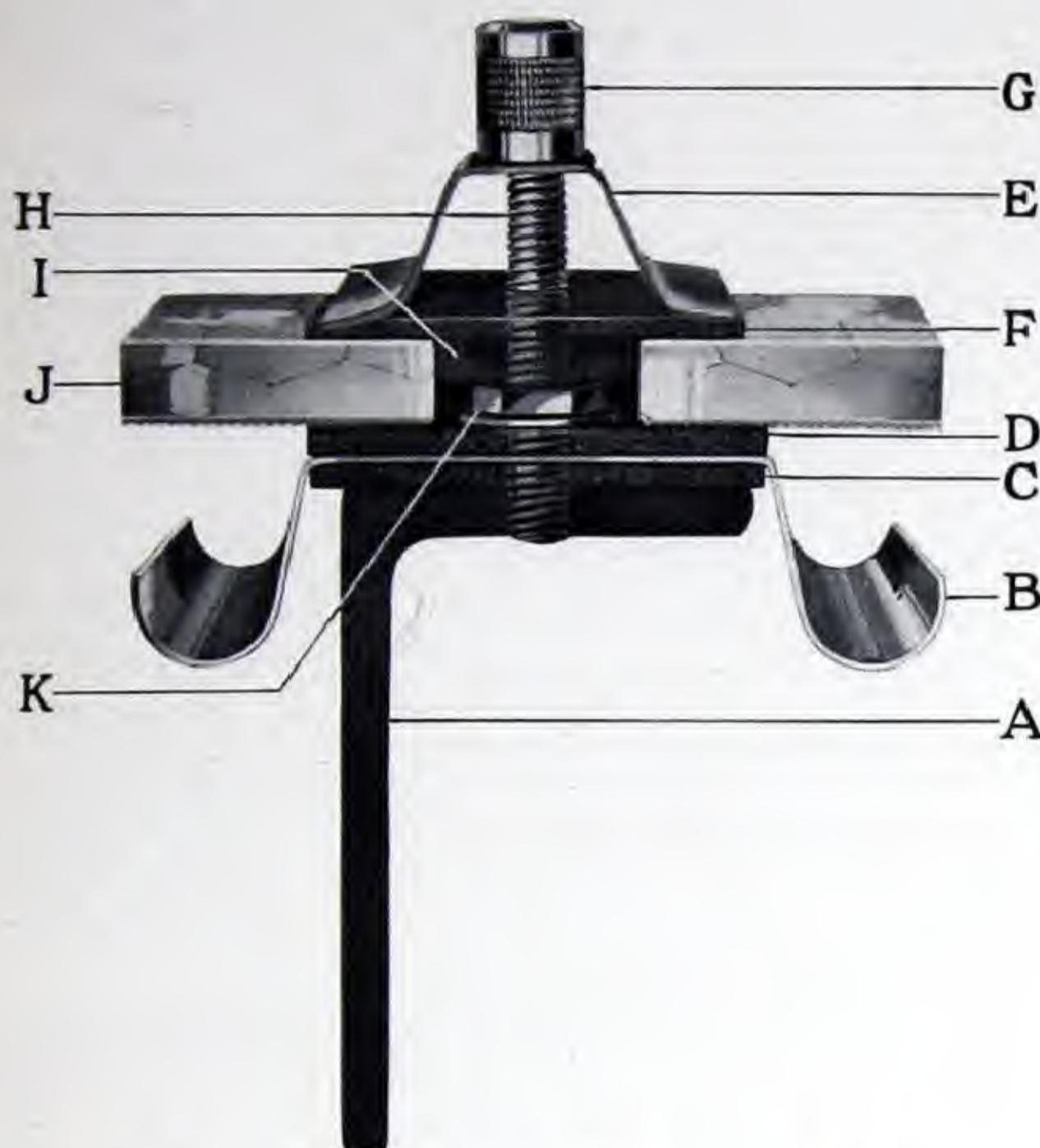
Type A is a comparatively new Robertson Skylight design. Its outstanding feature, as will be seen from the de-

scription on the following page, is the fact that it combines all of the essential characteristics of an ideal skylight in a design of remarkable simplicity and at a very moderate cost. Type A is furnished with caps and gutters of copper or galvanized steel or other suitable materials.

The chief causes of broken glass in skylights are deflection of supporting members or improper cushioning and separating methods. Robertson Glazing Construction provides a double safeguard against glass breakage. A rolled steel bar (angle or channel) provides a firm, rigid, durable supporting member. The maximum deflection of the Robertson Bar (1-30 in. per lin. ft.) is never such that glass breakage will result from lack of initial bar stiffness. Furthermore, Robertson Skylight Construction provides a non-absorbent, resilient, insulating bed for the glass.

### Service

Robertson Glazing Construction is backed by a complete engineering service which assures perfect installation and complete satisfaction. The Robertson Skylight Catalog, giving complete and detailed information regarding all types of Robertson Glazing Construction and Robertson Skylight Engineering Service, will be sent on request.



Cross Section (Type A)

(A) *Rolled Steel Bar Beam.* Always sufficiently strong (regardless of span) to carry its load without deflection.

(B) *Copper or Galvanized Steel Condensation Gutter.* Not a part of the supporting member, but completely separated from the bar by insulation.

(C) *Insulation.* This insulation eliminates the possibility of electrolytic action between bar and condensation gutter.

(D) *Glass Cushion.* The glass rests on a durable, water-tight asphaltic cushion which, because of its flexibility and adhesive character, adapts itself to all irregularities in the surface of the glass, forming a continuous, leak-proof union.

(E) *Copper or Galvanized Steel Cap.* Scientifically designed, yet extremely simple in construction. It is so constructed that it is perfectly rigid between the studs, and the pressure it exerts is continuous and equal at all points.

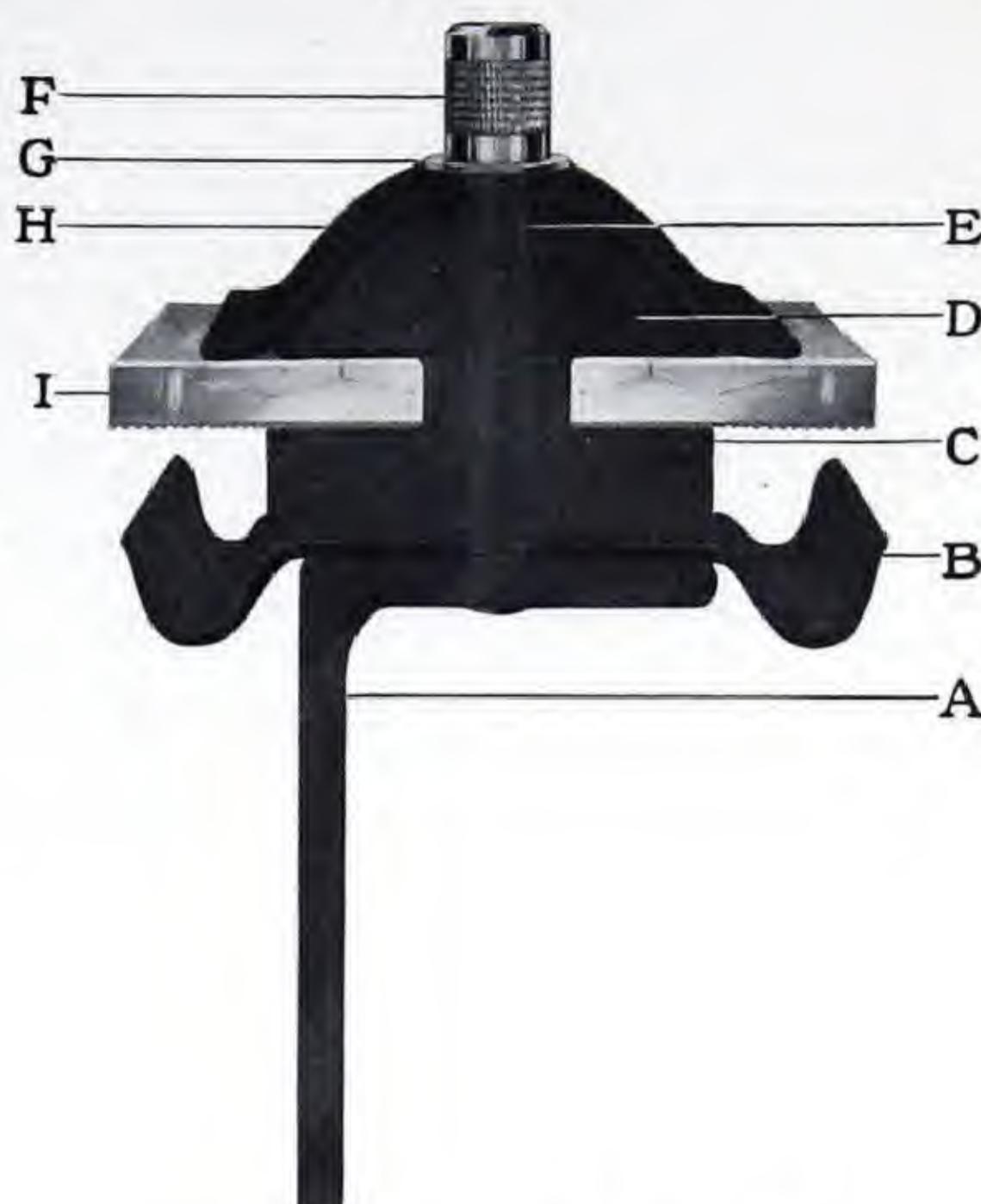
(F) *Asphaltic Seal.* Seals the cap and glass together, entering all depressions and adhering to the glass.

(G) *Cap Nut and (H) Brass Stud.* These details clamp the glass between the flexible cushion, insulation and asphaltic seal, insuring permanent and water-proof joints.

(I) *Spacer.* Prevents the contact of glass with the lock nut.

(J) *Glass.* As specified.

(K) *Brass Lock Nut and Washer.* Holds the insulation and asphaltic cushion firm against the gutter.



Cross Section (Type B)

(A) *Rolled Steel Bar Beam.* Always sufficiently strong (regardless of span) to carry its load without deflection. Where corrosive conditions are particularly severe, the Bar (A) can be protected by the Robertson Process of Metal Protection. Painted bar is furnished unless otherwise specified.

(B) *Robertson Protected Metal Condensation Gutter.* Fits snugly over the top of the bar, but is not an integral part thereof.

(C) *Glass Cushion and Separator.* The glass rests on a cushion of special high-grade asphaltic compound that provides a broad, continuous, permanent bed. This cushion is pliable, non-absorbent and durable. It positively keeps the glass from contact with all solid substances, even the stud, thus preventing destructive strains.

(D) *Cap Filler.* The edges of the lights of glass and the joints between them are covered and bridged with a half-oval section of asphaltic compound similar to that used in the cushion. This filler, owing to its plastic character, enters all depressions and adheres to the glass. It provides a continuous, perfect seal.

(E) *Brass Stud and (F) Cap Nut.* These details clamp the glass between the flexible cushion and filler, insuring permanently water-proof joints.

(G) *Brass Washer.*

(H) *Robertson Protected Metal Cap.* Protects the cap filler and distributes pressure evenly and continuously.

(I) *Glass.* As specified.



H. H. ROBERTSON COMPANY'S PLANT AT AMBRIDGE, PA.

**HH ROBERTSON CO**  
 BUILDING PRODUCTS  
 Cable Address ROBERTROOF  
 PITTSBURGH, PA., U. S. A.

*Factories:* Ambridge, Pa., Sarnia, Ont., Ellesmere Port, Cheshire, England.  
*Branch Offices:* In all principal cities in the United States.  
 Also London, E. C., 3 England, 110 Fenchurch St.  
*For Canada:* H. H. Robertson Co., Limited, Sarnia.  
*General Sales Agents for Canada:* B. & S. H. Thompson & Co., Limited.  
 Montreal, Toronto and New Glasgow, N. S.

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 BIRMINGHAM, Ala. .... 724 Brown-Marx Bldg.  
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*Agencies in leading cities*

The H. H. Robertson Company is the original manufacturer of Robertson Protected Metal and owns and controls the basic patents covering the material, the processes and the methods employed. It maintains its own laboratories for experiment and research, and in consequence of the care and attention given to every detail and to each stage of the manufacture, a uniformly high grade, economical and meritorious product is assured. Robertson Protected Metal in its various forms, the processes of manufacture and the machinery employed are covered in part by United States patents dated as follows:

Apr. 3, 1906; Apr. 24, 1906; Sept. 5, 1911; Oct. 5, 1911; Apr. 22, 1913; Nov. 3, 1914; Oct. 12, 1915; Jan. 11, 1916; Jan. 18, 1916; Apr. 4, 1916; Aug. 15, 1916; Jan. 16, 1917; Mar. 27, 1917; May 29, 1917; Aug. 14, 1917; Oct. 16, 1917; Oct. 23, 1917; May 21, 1918; Sept. 3, 1918; Oct. 8, 1918; Nov. 19, 1918; Dec. 14, 1918; Mar. 25, 1919; Jan. 13, 1920; Apr. 20, 1920; Feb. 1, 1921; Dec. 6, 1921; Jan. 27, 1922; Mar. 28, 1922, and Oct. 17, 1922.

Other patents allowed and pending in the United States, Canada, England, France, Belgium, Australia, Japan and New Zealand.

Quotations for Robertson Protected Metal products, the Company's literature, the services of its Engineering Department, or any other information regarding the H. H. Robertson Company's products, may be obtained by addressing the Company at any of its offices.